I. INTRODUCTION

In 1910 John Moody, the founder of Moody's investment ratings service, was extremely concerned about the pace of financial innovation:

Twenty-five years ago it was comparatively easy to acquire a sound knowledge of the general investment field... [however] the different types of securities have multiplied in number to an almost unlimited extent... [T]he different types of [financial instruments] which are daily sought for investment nowadays are often so different... that not only must each class be judged by itself, but a great many issues of the same general class have distinct traits which go far to affect directly their position and value as investments.1

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Many people claim that the financial innovations that have taken place over the past twenty-five years are even more impressive. Perhaps they are right. In particular, collateralized mortgage obligations (CMOs), zero coupon bonds, high yield (junk) bonds, exchangeable bonds, Nikkei put warrants, adjustable rate and auction rate preferred stocks, SuperShares, natural gas derivatives, credit card receivables, PIK bonds, index futures, municipal bond futures, and Eurodollar futures are all new securities instruments. Additionally, swaps and trading strategies such as portfolio insurance have come onto the scene to change the way that trading is done in fundamental ways. However, complex derivative instruments, including options, forward contracts, and futures, have played important roles in investment, risk-reduction, and speculation since the Seventeenth century. And, as Robert Merton has observed, even money itself, in its original incarnation, was a derivative instrument because the value of money originally was “‘derived’... from its convertibility into the underlying gold held in deposits.” Thus, not only is financial innovation a time-honored tradition, so too are derivatives, the financial instruments that are the subject of this symposium issue of the Journal of Corporation Law.

This does not mean that the topic of this symposium is dated. After Orange County, Metallgesellschaft, Gibson Greetings, and Procter & Gamble, not to mention Barings PLC, the timeliness of this topic is evident. However, it is important to maintain a reasonable perspective on the supposed “lessons” to be learned from the problems of the past few years. There have been loud cries for more regulation, and already much has been written on the issue of greater government intervention in the derivatives markets.

Two features in recent financial history seem particularly noteworthy because they represent changes from historical patterns. First, the pace of financial innovation in the derivatives market is faster than ever. Not only are more new financial instruments being developed, but the life cycle of innovation seems to be shortening. New financial instruments move, at an ever-quickening pace, from the drawing board to practical application and finally to obsolescence. Second, the growth in financial instruments has reversed the historical trend in which increasing numbers of financial instruments were being traded in centralized market settings. In contrast, the growth in derivatives trading

2. Merton Miller, Financial Innovation: The Last Twenty Years and the Next, 21 J. Fin. & Quantitative Analysis 459, 460 (1986) (observing the 1970s and 1980s, Miller asks, “Can any twenty-year period in recorded history have witnessed even a tenth as much new development?”).
4. A derivative is simply a financial instrument whose value is based on or derived from other assets or variables. Hal Scott & Phillip Wallons, International Finance, Transactions, Policy and Regulation 289 (1995).
over the past five years has been in over-the-counter derivatives which are transacted in private, contractual settings that are removed from centralized exchanges or trading markets. Because of this phenomenon, regulators and market participants are less able to "free-ride" on the monitoring and price-setting characteristics of the marketplace. As Robert C. Merton observed, this phenomenon puts "greater pressure on the underlying financial institution's capability to price... derivatives and manage their risk."8

This Article argues that, contrary to the prevailing wisdom, the explosion in the use of derivatives actually has more to tell us about the nature of the regulatory state than vice versa. In a nutshell, if the recent growth in derivatives is only different in degree, rather than different in kind, from other sorts of innovation, then the derivatives phenomenon provides an important opportunity to study the way government responds to changing marketplace conditions.

The Article begins with a brief analysis of derivative financial instruments. The purpose of this discussion is to show that the economic functions of derivatives are no different from the economic functions of other, more traditional, financial instruments. Building on this analysis, this Article shows that existing regulatory analysis has been unsuccessful. The Article then discusses some of the implications of derivatives trading for our understanding of the modern regulatory state.

II. THE ECONOMICS OF DERIVATIVES

In an important series of articles, Robert C. Merton has developed the so-called "functional perspective" on financial innovation.9 This Part of the Article first describes the functional approach to regulation and applies this analysis to derivatives. It then provides some economic arguments to explain why the pace of change in financial innovation has been so rapid. Finally, this part discusses some of the potential regulatory problems that might exist as a result of the derivatives explosion.

A. The Functional Approach to Financial Innovation

Traditional approaches to financial innovation have looked at the attributes of particular financial instruments or the institutions that deal in those instruments. Others focus on institutional factors, such as regulations or tax rules and their relationship to financial innovation and new securities design.10 These approaches have been unable to explain the causes or the consequences of the rapid pace of financial innovation over the past twenty-five years.

7. MERTON, supra note 5, at 3.
8. Id.
The functional approach to financial innovation holds more promise. It seeks first to identify the core, permanent economic functions of financial innovations and existing financial products. It then seeks to disaggregate or "decompose" new innovations and products into these core, "permanent" functions. The functional perspective has the advantages of providing stable evaluative criteria and enabling market participants, regulators, and academics to see the similarities among seemingly unrelated kinds of securities.

For example, the dynamic trading strategy of portfolio insurance must be compared with exchange-traded put options and explicit guarantees by insurers, because even though all three are cloaked in different institutional garb, they address a common problem: risk management. Similarly, in the nineteenth century, three quite different innovations—voting trusts, bond covenants, and preferred stocks—all attempted to resolve conflicts between stockholders and bondholders.

In other words, the functional approach to derivatives analysis will identify the practical problems that securities design is attempting to solve. Then it draws connections between those derivative instruments and other, often seemingly unrelated, instruments that are attempting to solve the same problem. Modern securities design has attempted to deal with a number of fundamental problems in corporate finance. Although risk management is perhaps the most well-known objective of securities design, reducing transaction and agency costs, avoiding taxes and other regulations, and revenue maximization also explain the characteristics of certain derivatives.

### 1. Risk Management

Derivatives are a means to risk management. This basic point is frequently misunderstood because it is often thought that derivatives can be used to increase or to decrease the risk associated with a particular transaction. But this is not the case. At best, the use of derivative instruments permits parties in financial transactions to shift the risks associated with such transactions to the parties that have the comparative advantage in bearing the risk. This is done by transforming uncertainty into risk, that is:

\[
\text{\ldots into a more or less reliable set of probabilities based on accumulated knowledge. Risk gauges the degree of imperfection in our predictions, sometimes summarized in the standard deviation or variance of a predicted value.}
\]

Risk can be converted from one type to another. Interest-risk can be transformed into credit risk, for example, by a swap or futures contract. Risk can be transferred from one party to another, as when a homeowner refinances a fixed-rate mortgage at a floating rate. Specific risks can be subdivided into component parts, as when an investor holds a floating-rate, government guaranteed loan. Here, the risk on the loan has been parceled out into interest-rate risk, assumed by the borrower; credit risk, assumed by

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11. Id.
12. Id.
the government; and prepayment risk, assumed by the investor. In short, risk can be managed.\textsuperscript{13}

For example, highly risk averse investors will be willing to forego the higher expected returns during a good state of the economy for protection from losses during economic downturns.\textsuperscript{14} Futures contracts written on financial instruments first emerged in the early 1970s as a response to clients' risk management needs.\textsuperscript{15} A futures contract, in which one party agrees to buy and the other party agrees to sell an asset at a specified price at a specified future time, allows investors to lock in current profits and to avoid losses on their underlying investments.\textsuperscript{16}

Most banks that enter into derivative contracts are simply attempting to meet their own risk-management needs. In this way, derivatives trading reduces rather than raises the risks associated with a bank's core business of lending and deposit taking.\textsuperscript{17} Of course, the simple transaction described here does not eliminate the risk of holding the underlying financial instrument (or portfolio of financial instruments). The transaction merely shifts the risks associated with future uncertainty to the counter-party.

Similarly, swap transactions can be used to manage risks. A swap transaction is an arrangement by which a party arranges to swap one stream of payments for another stream of payments with different risk characteristics. For example, suppose that a U.S. machine-tool company contracts to purchase a custom-designed and manufactured fabricator from a German company. The contract is denominated in marks, and payments are made in installments throughout the design, construction, and delivery phases of the contract. Clearly, the U.S. firm faces exchange rate risk because future declines in the value of the dollar will raise the cost to the U.S. firm of purchasing the German marks necessary to make payments under the terms of the contract. The U.S. firm can eliminate this risk by purchasing a swap contract, in which it agrees to make payments in dollars in exchange for the counter-party's agreement to make payments in German marks. Again, the derivative contract described here shifts, but does not eliminate, the risk of currency fluctuations to the party better able to handle such risk.

2. Transaction and Agency Costs

In addition to risk management, swaps and other derivative transactions are used to economize on transaction costs. It is well known that all market participants are not equally informed about the riskiness of their transactions.\textsuperscript{18} The informational asymmetry that exists among market participants provides yet another core economic justification for swap transactions. This phenomenon is best explained in the brilliant descrip-


\textsuperscript{14} ARNOUD A. \textsc{Boot} et al., \textit{THE THEORY OF SECURITY DESIGN} 11 (Tinbergen Institute Discussion Paper No. TI 94-19, 1994).

\textsuperscript{15} \textit{Id.} at 12.

\textsuperscript{16} SUSAN ROSS \textsc{Marki}, \textit{DERIVATIVE FINANCIAL PRODUCTS} 5, 13-16 (1991).

\textsuperscript{17} \textit{See} Jordon, \textit{supra} note 13, at 2.

\textsuperscript{18} \textsc{Boot} \textit{et al.}, \textit{supra} note 14, at 5.
tion of interest rate swaps presented by J. Gregg Whittaker for the Federal Reserve Bank of Kansas City.\footnote{19} In his example, Whittaker shows how the party that puts together a swap can use its superior information about credit risk to economize on borrowing costs for its clients, and to earn a fee for itself. The example involves three firms: (1) "XYZ," a non-financial firm with a low credit rating that wants to borrow fixed-rate funds for a long-term investment project; (2) "Eurobank," a European bank that has a higher credit rating than XYZ, that wants to borrow U.S. dollar-denominated floating-rate funds (Eurobank wants to borrow money at a rate of interest that is linked to some pre-determined rate which changes or "floats" as the market rate of interest to which it is linked fluctuates over time); and (3) a U.S. bank that has business dealings with both XYZ and Eurobank.

Since Eurobank has a higher credit rating than XYZ, it can borrow funds of any type at lower rates than those available to XYZ. Assume company XYZ can borrow floating-rate funds at 1 percent over LIBOR (the London Interbank Offering Rate) while Eurobank can borrow at 0.5 percent over LIBOR. Further, assume that Eurobank can borrow at 12 percent in the bond market while XYZ can borrow at a 14 percent fixed rate. While Eurobank has an advantage in both credit markets, it has a greater advantage in one market than in the other. Compared with Eurobank, XYZ must pay a two percentage point premium for fixed-rate funds but only a 0.5 percentage point premium for floating-rate funds. This difference creates a borrowing wedge that can be exploited through an interest rate swap.\footnote{20}

The way the swap might typically be structured would be for Eurobank to issue seven-year, fixed-rate Eurobonds at 12%, while XYZ takes out a floating-rate bank loan on which it pays LIBOR plus 1%. The U.S. intermediary bank then arranges to swap the interest payments due on this borrowing. After the swap, XYZ pays Eurobank’s fixed-rate obligation of 12%, plus brokerage fee of, say, 0.1% to the large U.S. bank. Eurobank pays only the LIBOR portion of XYZ’s floating rate obligation of LIBOR plus 1%, leaving XYZ to pay the remaining 1%. Thus, Eurobank has a floating rate obligation to pay the LIBOR rate, while XYZ has a total fixed-rate obligation of 13.1% (12% plus the 0.1% brokerage fee, plus the one percent it must pay on its floating rate obligation.)\footnote{21} This swap transaction benefits all three parties. The intermediary bank gains a brokerage fee of 0.1%. XYZ lowers its borrowing costs from 14% to 13.1%, while Eurobank lowers its borrowing costs from LIBOR plus 0.5% to straight LIBOR. In large transactions, interest rate savings of the magnitude described here can translate into millions of dollars.

In this situation, the U.S. bank, with its superior information about the borrowing needs and credit-worthiness of Eurobank and XYZ, is able to earn a fee for serving as intermediary in this transaction. Securities design helps to mitigate the problems of

\begin{footnotes}
\footnotetext{19}{J. Gregg Whittaker, \textit{Interest Rate Swaps: Risk and Regulation}, 72 \textit{Fed. Reserve Bank of Kansas City Econ. Rev.} 3, 5-7 (1987).}
\footnotetext{20}{\textit{Id.}}
\footnotetext{21}{\textit{Id.}}
\end{footnotes}
informational asymmetry in other ways. For example, one problem typically faced by fixed claimants is the risk that the equity claimants (shareholders) will transfer wealth to themselves from the bondholders by increasing the riskiness of the projects that the firm is pursuing ex post. The residual claimants will receive all of the additional, unexpected revenues from such risky projects, while the fixed claimants receive none of the benefits, but must share in any losses in case of bankruptcy. This situation gives residual claimants an incentive to increase an investment riskiness ex post (i.e., after the fixed claimants have put in their money).

Suppose that a particular investment will result in a payoff of $100 with absolute certainty. Suppose further that this $100 will be used to repay bondholders the principal and interest due to them, and that this sum comes to $50. The remaining $50 will be paid to the shareholders in this example. However, if the shareholders switch projects after the investment has been made to one with more risk, they are likely to suffer what may be an unanticipated loss. The shareholders (who typically have exclusive voting power and thus control the firm’s board of directors) may decide to shift the firm’s investments to a project with a 50% chance of paying off $200 and a 50% chance of failing completely (i.e., resulting in an ultimate payoff of $0). The expected value to the shareholders of the second investment is $75 \[ ((200-50) \times 0.5) \times (0 \times 0.5) \]. This compares favorably with the expected value of only $50 from the first investment. By contrast, for the bondholders the expected value of the second investment is only $25 \[ (50 \times 0.5) \times (0 \times 0.5) \], which compares quite unfavorably with the expected value of $50 under the first investment.

Derivatives provide one way that the bondholders can eliminate the risk associated with this sort of opportunistic behavior. If the firm gives the bondholders a type of derivative called a put option, which allows them to sell their bonds back to the firm for a specified price under certain conditions, the bondholders will be protected from the perils of the shareholders’ excessive risk-taking behavior. Similarly, a recent innovation known as the interest rate reset note permits the interest rate paid to bondholders to be adjusted to changes in the bond issuer’s credit rating. This, of course, reduces the shareholders’ incentive to increase risk ex post by imposing a financial penalty on them for doing so.\(^\text{22}\)

Finally, if the bonds are sold with the option of converting them to equity, either in the form of common or preferred stock, the shareholders will be protected because the bondholders can wait and see how risky projects turn out. If they turn out badly, the bondholders can retain their status as fixed claimants by not exercising their conversion rights. If the project turns out well, the bondholders will convert their investments to equity, which will enable them to share in the upside potential of whatever investments the shareholders decide to pursue. These conversion features, however, also dilute the shareholders’ gains because such gains must be shared with the bondholders. In this way, convertibility of securities enables investors to reduce the agency costs of debt

because it reduces the shareholders' incentives to take risks at the expense of the bondholders.\textsuperscript{23}

3. Taxation and Regulation

Perhaps the most widely known example of financial innovation is the zero coupon bond. The U.S. tax laws permitted bond issuers to amortize the implicit interest on a zero coupon bond on a straight line basis for tax purposes. This created a tax arbitrage opportunity until the law was changed.\textsuperscript{24} Similarly, in Japan, income earned from holding a zero coupon bond qualifies as a capital gain which is not taxable.\textsuperscript{25}

It seems clear that regulation provides at least a partial explanation for the explosion in the use of derivative instruments in the United States. As noted above, one important economic role for derivatives is in controlling the creation of what economists call "moral hazard" by shareholders. In this context, moral hazard refers to the proclivity of shareholders to increase the riskiness of the projects undertaken by the firm after the firm has issued debt. In addition to derivatives, another way that firms can control moral hazard is by contractual arrangements between bondholders and other fixed claimants and the firms in which they have invested. However, in the United States, a variety of legal rules prevent American financial intermediaries from protecting themselves contractually against the moral hazard problem posed by shareholders. Mark Roe has chronicled a number of these rules.\textsuperscript{26}

Roe emphasizes the legal rules that curtail the ability of American financial intermediaries to exert management control over the firms to which they have loaned money. As Roe observes, "American legal restrictions have historically kept American banks small and weak, by banning them from operating nationally, entering commerce, affiliating with investment banks, equity mutual funds, or insurers, or from coordinating stockholdings with these other intermediaries."\textsuperscript{27} Restrictions such as these, as Geoff Miller and I have observed in another context, "[raise] capital costs and [lower] allocative efficiency by raising the costs of fixed claims in American firms."\textsuperscript{28}

In addition to preventing American banks from becoming as powerful as their rivals in such countries as Germany and Japan, U.S. law prevents banks and other fixed claimants from crafting reliable legal protections against shareholder opportunism and moral hazard.\textsuperscript{29} For example, expansive and unjustified interpretations of the doctrine

\textsuperscript{24} BOOT ET AL., supra note 14, at 10.
\textsuperscript{25} Id. at 10-11.
\textsuperscript{26} Mark J. Roe, A Political Theory of American Corporate Finance, 91 Colum. L. Rev. 16, 16-31 (1991); Mark J. Roe, Political and Legal Restraints on Ownership and Control of Public Companies, 27 J. Fin. Econ. 7 (1990).
\textsuperscript{27} Mark J. Roe, Some Differences in Corporate Structure in Germany, Japan, and the United States, 102 Yale L.J. 1927, 1948 (1993).
that fixed claimants have an obligation to act in good faith toward borrowers have undermined the ability of banks and other fixed claimants to protect themselves against moral hazard. Similarly, "expanded principles of lender liability have enabled borrowers to engage in opportunistic behavior, transferring wealth to themselves from their banks by bringing law suits against banks that threaten to enforce their contractual rights against the borrowers."

Threats by banks to use a management change clause (a contractual provision designed to give lenders the ability to declare a default if top officers came into power who did not meet their approval) have even given rise to successful causes of action by borrowers for interference with contractual relations between the borrowers and their employees. Courts have even suggested that banks must loan more money or give more advance notice of termination of a lending relationship than required by contract. Further, lender liability under U.S. environmental law raises the danger that banks that become actively involved in the affairs of borrowers in order to protect the value of their security interests may face massive liability.

Bankruptcy laws also chill the incentive of U.S. banks to take an active role in the affairs of borrowers. This is true even when such intervention would be most helpful—when the borrower is in distress. Specifically, senior lenders can be stripped of their claims to collateral or have their claims subordinated to the claims of junior lenders, or both, if other creditors can show that the lender exercised some degree of control over the borrower. This principle, which is known as equitable subordination, provides a powerful disincentive for banks to play an active role in corporate governance. In the classic American Lumber case, a U.S. bank assisted in restructuring a troubled debtor and advanced it extra funds. When the debtor began to fail despite the bank's efforts, the bank tried to obtain the return of its funds. The other creditors complained of preferential treatment and persuaded a court to subordinate the bank's claims to theirs.

Thus, the problem with American corporate governance may not be a lack of concentrated share blocks and powerful financial intermediaries as Roe suggests. Rather, the problem may be that courts and legislatures in the United States are unwilling to enforce the contractual provisions upon which financial intermediaries and borrowers agree. Enforcing these contractual provisions would not only protect the banks from moral hazard, they would also permit borrowers to avoid excessively high borrowing costs.

In other words, in the United States, derivative instruments are used as a low-cost substitute for legal protections that might otherwise protect fixed claimants against the excessive risk-taking proclivities of equity claimants. This use of derivative financial

S.W.2d 661 (Tex. 1984); Connor v. Great W. Sav. & Loan Ass'n, 69 Cal. 2d 850 (1968).
32. State Nat'l Bank of El Paso, 678 S.W.2d at 661.
33. K.M.C. Co., 757 F.2d at 759-63.
34. See U.S. v. Fleet Factors Corp., 901 F.2d 1550 (11th Cir. 1990), cert. denied, 498 U.S. 1046 (1991); but see In re Bergsoe Metal Corp., 910 F.2d 668 (9th Cir. 1990).
36. Id.
instruments is particularly important in the United States, where fixed claimants are economically and politically weak relative to equity claimants, and where the legal system does not adequately protect the contractual rights of fixed claimants.

One of the more important lessons of modern corporate finance is that one can use a variety of different trading strategies to achieve the same economically equivalent position. Modigliani and Miller showed that individual investors can create the amount of leverage they want from their investments simply by borrowing to fund such investments. More recently, Robert Merton has shown that there are at least eleven ways in which an investor can take a leveraged position in the Standard and Poor's (S&P) 500. An investor can buy each stock in the index on margin in the stock market, invest in an S&P stock index fund with borrowed money, purchase an over-the-counter forward contract on the S&P 500, purchase over-the-counter calls and sell short over-the-counter puts, or borrow to buy a variable-rate annuity contract that has its return linked to the S&P 500.

Some of these strategies for obtaining the same economic position (a leveraged position in the S&P 500) involve one or more trades in derivative instruments while others do not. The point here is that the regulatory implications and tax consequences of these various strategies will alter the relative demand for these alternatives because regulations and taxes will affect the costs of one alternative in relation to another.

4. Revenue Maximization

Of course, derivatives are used by people who have no interest in avoiding regulation, or in hedging other investments, or in reducing agency costs. Some people will engage in derivatives trading simply to make money, by speculating or playing the market in some other way. Derivatives trading permits investors to gain the advantage of leverage in their investments. For example, an investor with $10,000 to put at risk, who thinks that a firm's stock is more valuable than its current trading price of $100 per share, has the choice of purchasing 100 shares of the stock, or of purchasing call options which give the investor the legal right to purchase the stock in the future for a previously determined price. Suppose, for the purposes of the example, that the call options expiring in two weeks' time have a price of $25 per option, and that each option gives the investor the right to buy 25 shares at a price of $105.


38. Other ways of reaching this same result include going long with a futures contract on the S&P 500, entering into a swap contract to receive the total return on the S&P 500 and paying LIBOR or some other standard interest rate in exchange, buying exchange-traded calls and selling short puts on the S&P 500, purchasing an equity-linked note that pays based on the S&P 500 and financing it by a repurchase agreement, purchasing a certificate of deposit from a bank that has its payment linked to the return on the S&P 500, or buying on margin the capital appreciation component of a unit investment trust that holds the S&P 500. See Merton, supra note 3, at 15-16.


40. GENERAL ACCOUNTING OFFICE, FINANCIAL DERIVATIVES: ACTIONS NEEDED TO PROTECT THE FINANCIAL SYSTEM 25 (1994).
If the investor has purchased the stock instead of the option and the price of the stock goes to $125 before the option expires, the investor will make a profit of $2500 on her $10,000 investment. On the other hand, if the investor has purchased 400 call options, giving her the right to purchase a total of 10,000 shares of stock, she will have made a profit of $190,000. In this way, investors can achieve greater profits through the leveraging characteristic of derivatives. Of course, the risks associated with derivative instruments are significant. In the previous example, if the firm's share price had not moved from the initial price of $100, the purchaser of the stock would not lose anything (except the transactions costs of making the investment). By contrast, the purchaser of the option would lose her entire $10,000 investment if the share price doesn't go above the exercise price of $105.

So-called risk arbitrage is an additional source of profitability in derivatives trading. For example, Nicholas W. Leeson, the Singapore-based trader who seems to have single-handedly brought down the venerable British investment house, Barings PLC, was originally hired to take advantage of price discrepancies between the Singapore International Monetary Exchange (SIMEX) and the Osaka Stock Exchange in the prices of futures contracts on Japanese stocks and bonds that were traded on both exchanges. Leeson was supposed to respond to information generated by his computer on the price discrepancies between the two markets, buying the securities offered at the lower price and selling the securities listed at the higher price.

As early as March 1992, almost three years before the January 1995 date on which Leeson began accumulating large trading losses, James Bax, the head of Barings Singapore office, notified Andrew Fraser, the head of Barings' brokerage and trading group in London, and recommended that Leeson's trades be reported to the Singapore office rather than to London. Later, in the summer of 1994, an internal audit at Barings acknowledged that Leeson's "excessive concentration of power" could lead to "error and fraud." Particularly amazing was the fact that Leeson was trading without any limits on the size of his positions.

In other words, Barings's shockingly bad internal oversight systems permitted a single rogue trader to engage in a pattern of highly speculative trading, which resulted in losses to Barings of approximately $1 billion. Moreover, as the value of Leeson's positions on the SIMEX and Osaka exchanges declined in value, Barings was required to meet margin calls to protect the exchanges against losses. The fact that Barings continued to meet margin calls from these exchanges up until the moment the firm col-

41. $190,000 = ($125 x 10,000 shares) – ($10,000 (the cost of the options) + $1,050,000 (the cost of purchasing 10,000 shares at the option's exercise price of $105)) = $1,250,000-1,060,000.


43. Broken Bank: Barings PLC Officials May Have Been Aware of Trader's Position, WALL ST. J., Mar. 6, 1995, at A1; Richard W. Stevenson, Barings Knew of Big Gamble, Officials Assert, N.Y. TIMES, Mar. 5, 1995, at A1. Bax's letter contained the following passage: "My concern is that once again we are in danger of setting up a structure which will subsequently prove to be disastrous and with which we will succeed in losing either a lot of money or client good will or probably both." Id.


lapsed indicates that Barings officials were aware of the magnitude of the firm's exposure to loss, although there is some indication that Barings' borrowing was done under the mistaken belief that Leeson's trading activities were done on behalf of clients. This seems dubious, because if the trading were done on clients' behalf, those clients would be required to meet any calls for additional margin. Indeed, Barings borrowed a total of $890 million to meet margin calls, $200 million in the week of February 17-24 alone. It is unlikely that the firm would extend this kind of credit to customers without contacting them. The Barings insolvency demonstrates that derivative securities trading presents garden variety problems of corporate governance and oversight: nothing more and nothing less. Barings got what it deserved for its lax monitoring practices.

Other firms, presumably, will learn from Barings and bolster their internal controls. There is nothing in the Orange County, Metallgesellschaft, Gibson Greetings, and Procter & Gamble losses to suggest anything else. The Orange County Investment Pool held sixteen percent of its assets in structured notes such as "inverse floaters," whose underlying value was inversely correlated to the interest rates on the financial instruments to which they were linked. The value of many of the investments made by Orange County were inversely linked to the LIBOR. Orange County lost $1.7 billion when interest rates went up. The critical aspect of the Orange County debacle was the highly leveraged nature of the investment pool. Under Robert Citron's direction, the fund added $12.5 billion in debt, collateralized by the $7.6 billion in investments in the pool. As with any highly leveraged investment, the risks increase geometrically with the amount of the leverage.

Metallgesellschaft AG, a German engineering and metals conglomerate, sustained one of the earliest and largest losses in derivatives trading, losing about $1.4 billion in early 1994 on a number of long-term commitments to buy short-term derivative contracts. Procter and Gamble lost $102 million in interest rate swaps with Bankers Trust Company in April 1994, while Gibson Greetings, Inc., reported a $20 million loss on several derivative contracts with Bankers Trust. In the Gibson Greetings case, a joint SEC/CFTC investigation of Bankers Trust revealed that Bankers Trust employees had deceived Gibson Greetings about the amount of money that it was losing on its derivatives positions, a finding that resulted in a $10 million fine against Bankers Trust. When taken together, these cases demonstrate two critical points about derivatives trading. First, there is nothing unique about these cases. Risk and leverage have been around for a very long time, and there is certainly nothing new about the use of esoteric trading instruments to achieve leverage.

51. Loomis, supra note 48, at 60.
Second, and more importantly, there was never a hint of systemic danger in these situations. The losses resulting from the speculative derivatives trading by these firms were internalized (i.e., borne by the investors themselves). Unlike the banking crises of the 1980s, these losses were not borne by regulatory agencies and taxpayers. Indeed the losses did not even spread to market participants generally. Firms that made bad decisions bore the losses. There is no reason to believe that such firms cannot be counted on to devise internal systems and implement policies to prevent future losses.

The closest brush with anything resembling systemic losses from derivatives activity came in connection with the demise of Barings, PLC. The Singapore and Osaka stock exchanges were guarantors of losses suffered in the event that Barings was unable to cover its trading losses. But, as noted above, Barings continued to make margin calls on its trading accounts until the moment it failed. The exchanges do not appear to have suffered losses as a result of Leeson's activity. Indeed, it was reported that “[o]nly four months after rogue trader Nicholas Leeson incurred losses of $1.2 billion in trades on Simex, the Singapore exchange appears well along in repairing damage to its image from the debacle.”52 One firm, Cargill Investor Services, Inc., which had client money trapped for weeks after the collapse, recently has opened a new office in Singapore.53

The Barings collapse shows that competition among exchanges will lead to optimal regulation without government intervention. This is because market participants will not direct their trades to markets that are insufficiently regulated. Market participants demanded better regulatory oversight after the Barings collapse, and they got it.

We’ve gotten assurances from the key people in Singapore, at Simex and at the Monetary Authority of Singapore that there will be more diligence in monitoring markets, says Richard Driver, Vice President of Cargill Investor Service. They’re obtaining more-detailed information on the nature of some of the trading and verifying trading strategies (to detect when traders are hedging and when they are speculating). After any experience of this kind, you learn how things can be done better.54

Indeed, it is entirely clear that competitive pressure is bringing about regulatory reform in the trading markets because market participants recognize that the SIMEX “must correct the errors of the past, and that if they don’t, some of this new business will quickly leave again.”55 John Damgard, president of the Futures Industry Association, puts it very well when he observes that the best regulated exchanges will enjoy the fastest growth, adding that: “Every one of our member firms that was involved in the Barings incident was called on by senior management to justify their presence in this market (given the apparent lack of regulation).”56

52. Suzanne McGee, Simex Appears To Be Healthy After Debacle, WALL ST. J., June 30, 1995, at C1.
53. Id.
54. Id.
55. Id. at C15.
56. Id.
B. Regulatory Implications of the Functional Approach

The argument to this point can be easily summarized. Derivatives should be viewed as the economic equivalent of highly leveraged transactions in non-derivative markets. As such, derivatives trading can cause large losses for investors and other market participants. However, there is nothing unique about the risks associated with derivatives trading; rather, this risk of loss is precisely the sort of risk associated with any sort of highly leveraged trading. There are two sorts of this risk. The first sort of risk involves the obvious risks of loss to the firms that engage in derivatives trading. The second sort of risk involves the risk of systemic loss within the financial system as a result of derivatives activity.

1. Localized Risk

Localized risk refers to the risk that each firm faces when it makes a derivative trade. Because the firms involved in derivatives trading bear such losses, they obviously have strong incentives to manage and control these risks. It is worth noting that in every one of the highly publicized examples of large losses in derivatives trading mentioned above, market forces disciplined firms that did not adequately control their derivatives operations. Bankers Trust Company, the bank that sold the derivatives products to Procter & Gamble and Gibson Greetings Cards, has also experienced severe market discipline in the form of damaged reputation as a consequence of its overly-aggressive sales practices, particularly in its dealings with Gibson. In response, the firm has undergone a management overhaul and embarked on a public relations campaign to begin to rebuild its reputational capital.

With respect to the regulatory implications of derivatives losses, it must be remembered that in the existing world of corporate finance there are numerous ways for financial institutions to achieve a leveraged investment position, or to accomplish other economic objectives for that matter. Consequently, regulation of derivatives activity is more likely to have the unintended consequence of forcing trading activity into less efficient (but economically equivalent) channels, rather than curbing or preventing such activity.

This last point about the futility of regulation is strongly reinforced by one of the principal lessons from the Barings affair. In that crisis, it became clear that it is extremely difficult to distinguish derivatives trading undertaken for the purpose of hedging and risk-reduction from derivatives trading undertaken for purely speculative purposes. It is particularly difficult to make these distinctions in large firms with complex trading positions. Any attempt to regulate derivatives will not only reduce the amount of speculation that takes place in derivatives, it also will reduce the amount of hedging and legitimate risk-reduction that can occur profitably.

Two final points about risk are in order here. First, regulators have expressed concern about the off-balance sheet nature of derivative products in general and swaps in particular. As Robert Merton has observed:

We hear much today about so many exposures being “off the balance sheet” and it is suggested that firms which use those [off-balance sheet] swaps or other off-balance sheet contractual arrangements do so to hide information from outsiders. At times and for some firms, there may be intent in hiding it, but the major reasons for [derivatives] being off balance sheet is that the
accounting system does not have a place to put them. Although such contracts have no initial value, they can have an immediate and enormous impact on the risk exposure of those assets that are on the balance sheet.\(^{57}\)

Inexplicably, the accounting problems associated with derivatives have been used as justification for substantive regulation of the financial intermediaries involved in derivatives trading:

The off-balance sheet nature of swaps has led to some concern on the part of bank regulators as to the vulnerability of these financial institutions. Traditional bank accounting and regulation does not provide for explicit recognition of off-balance sheet items and the risks associated with them. This deficiency has been addressed by the Federal Reserve’s new guidelines for risk-based capital requirements.\(^{58}\)

It is peculiar to the point of perverse to argue that swaps should be regulated because they are off-balance sheet items that impose difficult accounting problems for firms and regulators. In particular, the idea that substantive regulatory provisions need to be changed because of accounting problems in the derivatives area is perverse; accounting problems should be met with accounting solutions. Accounting is designed to solve valuation problems (i.e., to present an accurate position of the financial condition of a firm) by showing net worth, profit and loss, and related information. Accounting was not intended to inform investors about the risks associated with particular activities. Risk is a concept that is concerned with future events, while accounting is a concept that is concerned with events that already have occurred. For this reason, accounting is “totally inadequate to deal with risk allocation.”\(^{59}\) And dealing with risk allocation is the fundamental problem that must be confronted by those who want to measure the possible effects of derivatives on a firm’s cash flow.

A closely related point concerns another aspect of risk. Viewed in isolation, swaps and other derivative transactions are quite risky. This risk is largely a by-product of the highly leveraged nature of these instruments. But summing the risks associated with each derivative investment is a completely misguided method of evaluating the risks associated with a firm’s derivative trading activities. Elementary financial theory teaches that diversification reduces risk because all investments do not react the same way to all new information. Consequently, stock price movements are not uniform but imperfectly correlated. This means that if one holds a well-diversified portfolio, the gains associated with one investment will cancel out the losses in another.\(^{60}\) The risks associated with particular investments—as opposed to the risks associated with general market movements—can be completely eliminated through diversification. As Richard Brealey, a noted financial economist, has observed, “the risk of a diversified portfolio will be less than the average risk of the separate holdings.”\(^{61}\) Thus, one of the most important in-

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57. MERTON, supra note 5, at 11.
59. MERTON, supra note 5, at 11.
60. RICHARD A. BREALEY & STEWART C. MEYERS, PRINCIPLES OF CORPORATE FINANCE 131 (3d ed. 1988).
61. RICHARD A. BREALEY, AN INTRODUCTION TO RISK AND RETURN FROM COMMON STOCKS 103
sights of modern finance is that holding a diversified portfolio can reduce the risk associated with investment in financial assets. As applied to derivatives trading, this implies that while the risks associated with derivatives trading may be large when viewed as isolated trades, when viewed as a portfolio of trades the risks may be negligible. And not only should an institution measure its risk by looking at its entire portfolio of derivative instruments, but also by looking at its other assets as well, in order to determine how the risks associated with each of these assets affects the riskiness of other assets.

2. Systematic Risk

The second category of risk associated with derivatives activity is systemic risk, that is, the risk that derivatives losses will not be localized, but instead will spread to firms, individuals, and institutions that are not in a position either to benefit from profitable trading activity or to avoid loss. As noted above, one example of this sort of loss would involve the failure of a centralized exchange as a result of the financial pressure of having to fulfill the contractual obligations for member firms that were in financial distress. More imaginative (and more implausible) scenarios would see derivative activity as setting off another Great Depression, forcing banks to stop lending in order to amass the cash necessary to cover trading losses.

The critical point about systematic risk is that the degree of systematic risk involved in derivatives trading depends on the volume of derivatives trading that is regulated. For example, in the manufacturing sector of the economy, which is less regulated than the banking sector, the failure of a firm causes losses to creditors and suppliers, but does not generally impose losses on customers or anyone else not fully competent to protect themselves contractually ex ante. By contrast, when a bank fails, the presence of federally sponsored (FDIC) insurance, as well as potential exposure on the part of the central bank (the Fed), makes it virtually inevitable that bank failures will involve some measure of systematic loss. However, for some reason, it is commonly thought that the threat of systematic risk creates a need for regulation. The truth is quite the opposite: regulation creates contingent government liability which, in turn, creates a demand for regulation.

Moreover, once it is recognized that the economic consequences of derivatives trading can always be replicated in the spot market, it becomes clear that derivatives trading may actually reduce rather than increase systematic risk. The systematic risk features of derivatives may be less than the systematic risk features of the products in the spot market they are replacing:

For example, with a daily volume between $600 billion and $1 trillion, the inter-bank foreign-exchange market appears to have a systematic-risk potential from settlement failure. The over-the-counter (OTC) option market for foreign exchange is in part a substitute for trades in the inter-bank market. The magnitude of exposure to contract default on OTC options is related to the difference between the principal amount and the strike price. In

(1983).

62. KAPNER & MARSHALL, supra note 58, at 389-90.
the foreign exchange market, principal amounts are exchanged and so the default exposure is the principal amount, not just the difference between the principal amount and the strike price. Therefore, although the options surely have exposure to contract default, their use as a substitute for standard foreign-exchange (forex) transactions actually reduces the magnitude of systematic exposure. Much the same point applies to the "Rolling Spot" forex futures contract traded on the Chicago Mercantile Exchange.63

In other words, a derivative contract often will have a loss exposure lower than the instrument it is replacing. This suggests that regulating the derivatives area without recognizing the substitutability of financial instruments can have unforeseen consequences and make the resulting financial system even more unstable.

Finally, it must be noted that market forces reduce the systematic risk associated with derivatives trading. Market forces are extremely sensitive to the credit quality of financial intermediaries because such intermediaries are the ultimate guarantors of the cash flows associated with derivatives trading. For example, because the swaps market is unregulated, market participants offer premiums to deal with AAA rated swap brokers. Salomon Brothers and Merrill Lynch have formed well-capitalized, AAA rated subsidiaries through which their swap activities are channelled. The willingness of firms, like Merrill Lynch, to inject large amounts of capital into their swap subsidiaries is a direct result of the lack of regulation in the swaps market. In contrast, regulation in commercial banking produces a situation in which commercial banks' principal creditors (insured depositors) are largely indifferent to the capital position of the firms in which they make investments.

Commentators seem to have gone out of their way to conjure up potential sources of systematic risk resulting from derivatives transactions. However, commentators have not done a particularly good job of distinguishing between the systematic risk and the non-systematic risk associated with derivatives activity. For policy purposes, it is important to distinguish between these two sources of risk since the potential costs associated with non-systematic risk are internalized by contracting parties while only some of the costs of systematic risk are borne by outsiders. As such, the public policy concerns associated with systematic risk are far more grave than the public policy concerns associated with localized, non-systematic risk.

For example, Professor Henry T.C. Hu notes that the complex mathematical models used to forecast prices and set derivatives trading strategy are imperfect.64 In particular, these models: (1) use historical data on price volatility to predict the range of future prices, (2) employ unrealistic assumptions about arbitrage possibilities and probability distributions of prices, (3) invoke certain unrealistic assumptions about hedging capabilities, and (4) are too complex to be reliable.65

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65. Id.
Obviously, Professor Hu is correct to note that options pricing models are not perfect. If they were, there would not be much trading in options. Speculators using the same, perfect models would arrive at the exact same prices for options, and consequently, there would be no room for the buyer and seller to bargain. After all, trading only occurs when market participants place different values on assets.

More fundamentally, Professor Hu, in my view, fails to adequately distinguish between the systematic risks posed by derivatives and the purely localized, non-systematic problems associated with derivatives trading. Professor Hu does recognize that superior trading models have high payoffs for the firms that develop them. Further, he quotes an article from the Investment Dealers Digest observing that in derivatives trading, “[a] very good model will make you money. An excellent model will make you more money.” But if the firms that develop superior options models internalize the benefits, why would they not internalize the costs as well? The answer is that they do. Firms that use faulty options trading models will lose money. This creates an incentive not to develop such products, or at least to manage their use so as to minimize their risk. While recognizing that the market risks of individual derivative transactions may offset each other and thus reduce overall market risk, Professor Hu appears to suggest that there is some, unspecified market risk associated with these transactions. If Professor Hu is referring to a form of localized risk (i.e., the risk to a particular firm from the vagaries of overall market fluctuations), then his analysis is correct. But if he is using the term “market risk” as synonymous with “systematic risk,” I believe he is mistaken to suggest that flaws in options trading models pose greater risks than the risks associated with the firms that employ these models.

Professor Hu is worried about the risks of derivatives. In particular, he is worried that firms dealing in derivatives cannot be relied on to invest enough in research and development to produce an efficient amount of risk information. His arguments are not convincing. First, he argues that because a substantial portion of the benefits from research and development expenditures can be appropriated by rival firms, there will be underinvestment. But even Professor Hu does not appear to take this argument seriously. He acknowledges that the problem “does not seem as worrisome” as those created by the inappropriability of traditional research in physics, chemistry, and biology. In particular, the problem does not seem worrisome because research and development into the risk characteristics of a particular portfolio or trading strategy are simply not appropriable. No two investment banks have the same portfolios, so the information developed by one firm could not be readily used by rivals. More importantly, while firms can sometimes copy the securities designs of another firm (although even this is difficult in the case of instruments that are not publicly traded), the information about the risk characteristics of the securities can be kept secret. Moreover, as Professor Hu recognizes, the real money-makers for these firms are the computerized trading programs, which also can be kept secret. As such, not only is the inappropriability problem in the derivatives area not unique, the better argument seems to be that inappropriability is not

66. Id. at 1477 (quoting Hal Lux, The Derivatives Lab, in INVESTMENT DEALERS DIGEST, at 22 (1992)).
67. Id. at 1480.
68. Id. at 1480-81.
69. Hu, supra note 64, at 1481.
a large problem in the derivatives area. This point seems particularly strong given the rapid rate of change in securities design. By the time a rival steals an idea, it is likely to be obsolete.

Professor Hu is also worried about cognitive bias. He worries that people may not act rationally because they will estimate the probability of an event by using their intuitions, which are primarily informed by "the ease with which related associations come to mind," rather than data.\(^70\) Professor Hu also expresses doubts about the ability of securities industry professionals to comprehend the legal problems associated with derivatives, since this is not their area of expertise and people "tend to overemphasize the importance of the field they understand best."\(^71\) There is more than a little irony at work when a law professor complains that derivatives traders succumb to the expert effect because they do not sufficiently emphasize the legal implications of what they are doing! Who really is succumbing to the expert effect here?

Professor Hu also notes that there may be serious principal/agent problems with derivatives trading because, among other things, quantitatively inept senior managers are incapable of understanding the risks associated with the activities of their less technologically challenged junior colleagues. The first problem with this analysis is that there is no indication that any problems of inadequate supervision of derivatives trading are not completely internalized by the firms doing the trading. A second, and even more fundamental, problem with the analysis is that if it is correct, it would seem to suggest that managers will take too few risks rather than too many. There is no reason to think that a senior manager will approve a new derivatives strategy or the introduction of a new derivatives instrument, particularly in an industry where the person involved in securities design is likely to leave the firm before the manager does, unless he is sure of the risk. After all, the senior manager has made an undiversified investment of one-hundred percent of his human capital in the firm for which he works. As such, even if he is compensated on the basis of performance, he is likely to be risk averse, rather than risk-preferring as Professor Hu suggests. And, as Professor Hu acknowledges, banks can and do obtain duplicate evaluations of trading strategies and derivatives valuations by different employees.\(^72\) Some firms even hire outside experts to audit derivatives modelling.\(^73\)

Again, it is unclear why derivatives are being singled out for special treatment under Professor Hu's analysis. Of course, he is undoubtedly correct to point out that human beings have cognitive biases of various kinds. But Professor Hu does not suggest, much less offer, a scintilla of evidence for the proposition that derivatives activity presents more serious problems of cognitive bias, or inappropriability, or agency costs, than other realms of human activity, such as, say, wine-making or automobile manufacturing. As such, it is not at all clear why derivatives trading should be regulated any differently than these other activities.

\(^{70}\) Id. at 1490.
\(^{71}\) Id. at 1491.
\(^{72}\) Id. at 1493.
\(^{73}\) Id.
For example, Professor Hu claims that the material risk of exposure on some derivatives can occur years after the execution of the transaction. But this is a generic problem with business decisions. Indeed, the problem is far worse in government than in the private sector, where bureaucrats and politicians make decisions that provide immediate benefits for some constituents, but impose future costs on others (by raising the deficit). And unlike the private sector, in the public sector there are no share prices to accurately reflect the perceived economic effects of these decisions.

Similarly, Professor Hu argues that the financial world "lacks many of the traditional controls that check scientific errors. It does not utilize the classic policing mechanisms of peer review, the referee system, and replication." These assertions are simply false. Like the major scientific journals, the Journal of Business, the Journal of Finance, The American Economic Review, the Journal of Financial Economics, and the other professional journals where much of the new research on derivatives is published are subject to rigorous peer review. In addition, all empirical results must be replicable. Professor Hu appears to be comparing the academic world in the field of finance to the academic world in law without support from any empirical study. Furthermore, in industry, outside of academia, similar problems exist. But the links between academic finance and applied finance are very close, with virtually every academic luminary, including Myron Scholes, Fisher Black, Robert Merton, and Michael Jensen, having close and long-standing ties to industry.

Finally, Professor Hu argues that in derivatives trading there is a huge temptation for traders to cheat. Traders cheat, according to Hu, because derivatives trading is one of the few areas on Wall Street where it is still possible to make a large amount of money. Hu believes derivatives traders may be especially tempted to cheat because of the extraordinary imbalance between risk and reward. Hu asserts that if a trader is caught cheating he may lose his job and have his reputation damaged, but "a successful gamble could mean lifetime wealth." At the time of this writing, Nicholas Leeson of Barings is awaiting trial in the U.K. while fighting Singapore's efforts to extradite him to face charges for criminal violation of that country's trading laws. Judging by Mr. Leeson's experience, the risks are significantly greater than Hu implies.

Traders who mask trades in order to avoid their firms' internal controls are engaged in fraud and may suffer far more than the mere loss of their jobs or adverse reputational consequences. Moreover, Professor Hu's rather glib analysis ignores the economic reality that traders have undiversified human capital investments in their jobs, and are thus more likely to be suboptimally risk-averse than risk-preferring. Similarly, it is well settled that the diminishing marginal utility of wealth leads people to be risk averse. Wealth has diminishing marginal utility because, for someone like a derivatives trader who is already well-off, the pain of suddenly becoming poor will be far greater than the joy of acquiring an additional few million dollars of wealth. For this reason, investors require risk premiums to compensate them for taking even fair gambles. For

74. Hu, supra note 64, at 1493.
75. Id.
76. Id. at 1492-93.
77. Id. at 1493.
all of these reasons, Professor Hu's analysis of the problems of derivatives simply does not ring true.

III. REGULATORY IMPLICATIONS

In the preceding discussion, I have argued that derivatives are not really as new or as threatening as is commonly supposed. Clearly, there are major risks in trading in derivatives, as such well-publicized fiascos as Orange County and Barings Bank illustrate. But as long as these risks are internalized, derivatives trading should be encouraged rather than discouraged since such trading creates wealth, permits risk hedging, and helps to eliminate certain economic frictions, such as the conflicts that exist in investment settings between bondholders and shareholders and the conflict between shareholders and managers.

On the one hand, derivatives should not be regulated. At the same time, however, the nature of derivatives trading has much to tell us about the nature of the regulatory state. In particular, some of the problems that regulators face in dealing with derivatives can be generalized to financial regulation more broadly. The next part of this Article explains some of these implications.

A. The Policymaker's Dilemma and the Problem of Regulatory Wealth Transfers

One of the biggest problems faced by regulators is what this author has described as the "Policymaker's Dilemma." The dilemma faced by policymakers is that mandatory rules devised by policymakers in the field of corporate law and securities regulation do not benefit all investors or all market participants. Instead, such mandatory rules simply transfer wealth from the investors in some firms to the investors in other firms.

The policymaker's dilemma arises because no system of rules for a complex phenomenon such as corporate governance or derivatives trading can possibly benefit all shareholders in all firms. As a result, any mandatory rule that is developed by policymakers will benefit the investors and participants in firms or markets that are well-served by such a rule and will harm those investors and market participants that are poorly served by the rule. For example, in the derivatives context, any rule that raises the costs of derivatives trading in order to reduce the amount of speculative trading also will reduce the amount of hedging and other benign forms of trading since it is virtually impossible to distinguish between these two types of trading. Similarly, any rule that attempted to cope with the alleged lack of oversight by senior management of derivatives trading, or with the alleged problem of the appropriateness of new innovations, would transfer wealth from those firms that have devised their own internal management systems and mechanisms for protecting property rights in innovation to other, less competent, rivals.

In other words, it simply is not possible for policymakers to benefit investors, traders, or other market participants by developing rules that successfully regulate whole

classes of transactions. Every trading strategy or transactional device can be used either to benefit investors and markets, or to harm investors and markets. By their very nature, mandatory rules are categorical; they impose categorical costs, or they forbid categories of transactions. Either way, they transfer wealth from the firms and investors that can cope without such protections to the firms and investors that need such protections. In derivatives trading particularly, where large, institutional investors and high net worth individuals constitute the market, the role for mandatory rules would seem highly questionable.

B. Closing the Barn Door After the Cows Are Out

Another problem with regulating in the derivatives area concerns the inevitable lack of information that regulators have. To quote Professor Hu, "regulatory adventurism" occurs when regulators act with insufficient information. A similar problem arises where derivatives regulators try to solve yesterday's problems. Because the risks posed by derivatives trading are internalized by the trading parties themselves, there are ample incentives for such parties to solve these problems themselves. Moreover, traders and other market participants also have strong incentives to anticipate future problems. The contractual solutions devised by parties to financial transactions can solve problems without the need for regulation. Indeed, regulation only invites opportunism. For example, during the 1980s, bondholders were occasionally surprised when the firms from whom they had bought securities engaged in leveraged buyouts and other financial transactions that substantially reduced bondholder wealth by increasing the amount of total debt outstanding. But, after the existence of the new financing techniques that made leveraged buyouts and related transactions possible became known, regulation became wholly unnecessary, because the bondholders could protect themselves from harm either by: (1) charging firms interest at a rate to compensate for expected risk, or (2) employing protective covenants, put options, convertibility features and other contractual devices that provide protection against the equity dilution that occurs in leveraged transactions. Thus, by the time the phenomenon becomes known to regulators, there is no need for regulatory action.

Regulatory action to protect bondholders would be harmful because it would lead to opportunism by bondholders and other investors who have already negotiated an interest rate sufficient to compensate them for expected risk. If the bondholders may also sue, they will obtain a windfall when the expected contingency actually occurs. Thus, in the derivatives area, as in other transactional contexts, providing legal "protections" for counter-parties is not only unnecessary in light of the ability of contracting parties to fend for themselves, but such protections inevitably will have unintended consequences and lead to opportunistic behavior by the protected groups.

There are unintended consequences in the financial markets just as there are unexpected events and unintended consequences from regulation. But if these events are unintended and unexpected to the market participants whose fortunes depend on making accurate forecasts of future events, they certainly will be unintended and unexpected to the regulators as well. After the future contingencies have revealed themselves, regula-

79. Hu, supra note 64, at 1513.
tion against these contingencies is truly like closing the barn door after the cows have departed.

C. Regulatory Oversight and Systematic Risk

In the preceding parts of this Article, I have argued that financial transactions that are functionally identical should be treated as such by regulators. To regulate over-the-counter puts and calls but not individual stocks and margin trading would be counter-productive since one form of trading can substitute for the other. This argument holds true not only for financial products, but for substantive regulatory issues as well. For example, it has been suggested that all over-the-counter derivatives be subjected to mark-to-market collateral requirements. Such a regulation, if not also imposed on all loans and other more traditional investments, could actually cause a shift back towards structures like parallel loans which were the functional predecessors to swaps. Parallel loans have total principal exposure, especially in cross-border trades, as well as aggregate gross interest exposure in terms of default by either party. Swaps, which have no principal exposure, only have net interest exposure. So, by focusing and putting restrictions on derivatives, but not treating other functionally equivalent alternatives that way, regulation formed with all good intent and the purpose to reduce those default exposures which can induce systemic events can actually increase that exposure.

Based on this analysis, it might seem logical to conclude that, since functional regulatory equivalents should all be regulated in the same way, the U.S. system of widely disaggregated regulatory control (in which regulatory authority over derivatives is divided among the Federal Reserve Board, the Comptroller of the Currency, the Securities and Exchange Commission, the Commodities Futures Trading Commission, and a host of state insurance commissioners) could not possibly be defensible. After all, as Professor Merton has observed, "in the real world, attempts to regulate (just a few) of the (many) ways of doing an equivalent thing, are not going to be effective and in fact they could be counter productive." However, combining regulatory authority into a single regulator could create more problems than it solves by increasing the amount of systematic risk in the financial system. The creation of a single regulator could have the "unintended consequence of actually inducing a systematic-risk component that did not previously exist."

A perfect example of this phenomenon occurred in connection with the Savings & Loan fiasco in the United States. Thrift regulations implemented by the Federal Home Loan Bank Board, which regulated thrift institutions during the 1980s, caused billions of dollars in S&L losses: first by encouraging these institutions to make long-term mortgage loans funded by short-term deposits, and then by encouraging these institu-

80. Merton, supra note 3, at 15.
81. Id.
82. Id. at 16.
83. Id.
tions to buy high-yield, junk bonds. S&Ls lost billions when interest rates went up, forcing the thrift industry to pay more for deposits than they were receiving in interest from borrowers. Later, more losses were incurred when new regulations inexplicably forced S&Ls to hold fire-sale liquidations of their high-yield bond portfolios. Thus, despite its drawbacks, the desegregated system of regulation in the United States may have the benefit of reducing the levels of systematic risk to which our financial intermediaries are exposed.

D. The Economic Theory of Regulation

If regulation produces the harmful effects described here, one should wonder whether it ever makes sense to regulate in the derivatives area. The answer, in my view, is that in their proper form, regulations can clearly benefit market participants as well as the economy by reducing the costs of transacting. Writing and enforcing contracts is costly. Parties to derivative transactions, like market participants generally, value clear rules that provide default, standardized, off-the-rack terms so that participants can save the cost of contracting. Standardized terms can avoid the policymaker's dilemma described earlier in this Article as long as the rules are default in nature (i.e., as long as the parties may contract around them).

The legal system provides added value for market participants by supplying missing terms and overlooked details with the provisions that the parties would have bargained for if they had "anticipated the problems and been able to transact costlessly in advance: [o]n this view, corporate law supplements but never displaces actual bargains . . ." In other words, many contractual terms are public goods that the government should supply, as long as the government permits the parties freely to contract around these rules. In sum, "the law completes open-ended contracts. There is no reason why it (the law) should be used to impose a term that defeats actual bargains or reduces the venturers' joint wealth."

Unfortunately, rent-seeking is likely to prevent regulation in the derivatives area from taking its optimal form. The economic theory of regulation shows that politicians are likely to make politically motivated decisions rather than economically motivated decisions. As Fred McChesney has observed:

[Investors] are a diffuse and poorly organized pressure group; management, by contrast, is concentrated and well organized, and thus is more likely to carry the day politically. One therefore predicts, and in fact finds, that shareholders cannot count on the legislature to do what is best for them. The prevalence of state antitakeover statutes for example, demonstrates how the law—using mandatory rules around which shareholders may not be able to contract—can be used to benefit management (and labor) at the expense of shareholders in the firm.

85. Id.
86. Id. at 35.
87. Fred S. McChesney, Economics, Law and Science in the Corporate Field: A Critique of Eisenberg,
Politicians can benefit from the derivatives explosion because the public has so little understanding of the problems posed by regulating derivatives. This "rational ignorance" on the part of the public results from the fact that, for the ordinary citizen, the payoff from spending the resources necessary to become an expert on derivatives regulation is not worth the costs. Therefore it is rational to remain ignorant. This rational ignorance on the part of individuals leaves the field wide open for politicians and industry groups to declare that there is a potential crisis in derivatives that calls for massive regulatory intervention. But far from preventing a crisis, the intervention is far more likely to provide private benefits for favored industry participants by cartelizing the industry and creating barriers to entry. Moreover, because of increased systematic risk and forced abandonment of derivatives trading for riskier trading strategies, such regulation is actually likely to make the industry more dangerous.

IV. CONCLUSION

Well developed financial markets are an integral part of the economic life of every industrialized nation. Financial markets are the engine through which a society's capital is allocated and through which its investment decisions are made. The trading firms that have flourished over time are the ones that have been able to keep credible commitments to investors—including the commitment to develop and maintain adequate systems of internal monitoring and control. The capital markets do not eliminate risk, but they do provide a mechanism through which risk can be allocated to those parties that are most capable of bearing it. Capital markets also can unbundle risk into its constituent parts and package risk into manageable forms.

Derivatives securities and modern securities design are a fundamental part of a system of capital allocation. The problems presented by securities design and derivatives trading are no different from the problems created by any other sort of innovation in the product markets or in the financial markets. The recent problems experienced by Orange County, Metallgesellschaft, Gibson Greetings, Procter & Gamble, and Barings, PLC are the inevitable manifestations of market discipline at work. In competitive functioning capital markets, one must take large risks in order to reap large rewards. If the regulatory system eliminated all risk, the market would respond by concomitantly eliminating returns to investors. For every Barings and Procter & Gamble, there are literally dozens of new millionaires and successful firms that have successfully managed the risks posed by derivatives. That is the way markets work.
